

REMARKS

The present Amendment amends claims 19, 20, 22 and 23 and leaves claim 21 unchanged. Therefore, the present application has pending claims 19-23.

In the Office Action the Examiner objected to the specification as containing various informalities. Particularly, the Examiner objects to the use of the phrase "a trouble". Various amendments were made throughout the specification to correct the informalities noted by the Examiner particularly to the change the phrase "a trouble" to the phrase "a failure". Therefore, this objection is overcome and should be withdrawn.

Claims 19-23 stand rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regards as the invention. Various amendments were made throughout claims 19-23 to bring them into conformity with the requirements of 35 USC §112, second paragraph. Therefore, Applicants submit that this rejection is overcome and should be withdrawn.

Specifically, amendments were made throughout the claims to overcome the objections noted by the Examiner in the Office Action.

The Examiner's cooperation is respectfully requested to contact Applicants' Attorney by telephone should any further indefinite matter be discovered so that appropriate amendments may be made.

Claims 19-23 stand rejected under 35 USC §102(e) as being anticipated by Otterness (U.S. Patent No. 6,460,122). This rejection is traversed for the following reasons. Applicants submit that the features of the present invention as now more

clearly recited in the claims are not taught or suggested by Otterness whether taken individually or in combination with any of the other references of record. Therefore, reconsideration and withdrawal of this rejection is respectfully requested.

Amendments were made to the claims so as to more clearly describe features of the present invention not taught or suggested by any of the references of record whether taken individually or in combination with each other. Particularly, amendments were made to the claims to more clearly recite that the present invention is directed to a storage system having a plurality of clusters and a communication path which connects each of the clusters to each other. According to the present invention, each cluster includes a disk controller and a plurality of disk drives wherein the disk controller of each cluster includes a disk interface which connects to the disk drive of the cluster, a cache memory and a control memory.

According to the present invention, when a first disk controller of a first clusters receives from a host computer a write request which requests writing of updated data for updating data stored in disk drives of a second disk controller of a second cluster, the first disk controller checks whether data to be updated by the updated data is stored in the cache memory of the second disk controller and if the data to be updated is not stored in the cache memory of the second disk controller, the first disk controller sends the write request to the second disk controller via the communication path. Further, according to the present invention, in response to the write request from the first disk controller and when the data to be updated is not stored in the cache memory of the second disk controller, the second disk controller updates the data to be updated which is stored in the disk drives of the second disk

controller by writing the updated data in the disk drives of the second disk controller via the disk interface based on the write request.

The above described features of the present invention now more clearly recited in the claims are not taught or suggested by any of the references of record whether taken individually or in combination with each other. Particularly, the above described features of the present invention are not taught or suggested by Otterness whether taken individually or in combination with any of the other references of record.

In the Office Action Applicants note that the Examiner expressed some confusion with respect to the language in the claims and that based on said confusion made various incorrect assumptions regarding the features recited in the claims. Particularly, the Examiner assumes the write request to be a generic request of any kind more akin to a read request rather than a write request. Amendments were made to the claims so as to more clearly recite that the features of the present invention are in fact directed to a write request which requests writing of updated data in disk drives of a disk controller so as to update data stored in the disk drives. Thus, it appears that the Examiner's reliance on the teachings of Otterness is completely misplaced since the features of the present invention regarding the operations performed between the first and second disk controllers are conducted relative to a write request not a read request as assumed by the Examiner. Since the claims have been amended in this regarding to clarify these features of the present invention, the Examiner's use of the teachings of Otterness no longer

applies to the current claims. Accordingly, reconsideration and withdrawal of the 35 USC §102(e) rejection of claims 19-23 is respectfully requested.

Even beyond the above, the features of the present invention as now more clearly recited in the claims are clearly not taught or suggested by Otterness. As per the above, the present invention as now more clearly recited in the claims are not taught or suggested by Otterness whether taken individually or in combination with any of the other references of record.

Otterness teaches a multi-level cache structure that distributes I/O processing load including caching operations between processors to provide higher performance I/O processing. Otterness teaches that each of a plurality of controllers store data in a zero level cache which is included in the controller. After the data is stored in the zero level cache included in the controller, Otterness teaches that the stored data is transferred to the other level caches. For example, the secondary storage apparatus which is managed by the other controllers.

In the Office Action the Examiner alleges that the operation of the system taught by Otterness in Fig. 12 thereof is the same as the operation of the present invention. However, the operation of the system taught by Otterness as illustrated in Fig. 12 thereof is an operation responding to a request for reading data rather than the writing of data as now more clearly recited in the claims. Particularly, Otterness teaches in Fig. 12 thereof that when a first controller receives a request for reading data, the controller determines whether the data is stored in the level zero cache or not. If the data is not present in the level zero cache, Otterness teaches that a determination is made as to whether the data is present in the level zero caches of

the other controllers. If the data is present in the level zero cache of another controller, Otterness teaches that the first controller requests that the data in the level zero cache of the other controller be sent to the first controller thereby reading data from the level zero cache of the other controller. Thus, it is quite clear that Fig. 12 of Otterness does not teach or suggest the features of the present invention as now recited in the claims.

Fig. 13 of Otterness does however teach an operation to request the writing of data. In Otterness, in Fig. 13 when a first controller receives a write request for writing data it stores the data contained in the write request in a level zero cache which is included in the first controller. Otterness teaches that after the data has been allocated, the data is moved into the level zero cache of the first controller from the host (step 702). When the data movement is completed, a determination is made as to where the data is to be finally stored (steps 703-707). Otterness teaches that in such operation, the first controller searches other controllers which include a cache which stores data to be grouped with the data stored in the first controller such as, for example, relative to parity generation. According to a result of such searching, the first controller as taught by Otterness determines whether to send the data stored in the level zero in of the first controller to the level zero cache of another controller. It is clear from Otterness that there is no teaching that in order to perform a request for writing data, the first controller makes a determination whether the data to be updated by the data of the write request is stored in the level zero cache included in another controller and if not sends the write request to the other controller as in the present invention.

The present invention as clearly recited in the claims provides an operation for checking whether data to be updated is stored in the cache memory of the second disk controller and if the data to be updated is not stored in the cache memory of the second disk controller, the first disk controller sends the write request to the second disk controller via the communication path. Such features are clearly not taught or suggest by Otterness.

Therefore, Otterness fails to teach or suggest when a first disk controller of a first cluster receives from a host computer a write request which requests writing of updated data for updating data stored in disk drives of a second disk controller of a second cluster, the first disk controller checks whether data to be updated by the updated data is stored in the cache memory of the second disk controller, and if the data to be updated is not stored in the cache memory of the second disk controller, the first disk controller sends the write request to the second disk controller via the communication path as recited in the claims.

Further, Otterness fails to teach or suggest that in response to the write request from the first disk controller and when the data to be updated is not stored in the cache memory of the second disk controller, the second disk controller updates the data to be updated which is stored in the disk drives of the second disk controller by writing the updated data in the disk drives of the second disk controller via the disk interface based on the write request as recited in the claims.

As per the above, it is quite clear that the features of the present invention as now more clearly recited in the claims are not taught or suggested by Otterness whether taken individually or in combination with any of the other references of

record. Therefore, reconsideration and withdrawal of the 35 USC §102(e) rejection of the claims as being unpatentable over Otterness is respectfully requested.

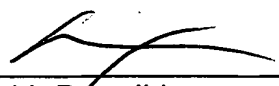
The remaining references of record have been studied. Applicants submit that they do not supply any of the deficiencies noted above with respect to the reference utilized in the rejection of claims 19-23.

In view of the foregoing amendments and remarks, Applicants submit that claims 19-23 are in condition for allowance. Accordingly, early allowance of claims 19-23 is respectfully requested.

To the extent necessary, the applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (520.39648X00).

Respectfully submitted,

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